WinSALTS

The Windows Version of the SALTS Program

General INMARSAT Information

SALTS CENTRAL

Naval Inventory Control Point
Code P-04E (SALTS)
700 Robbins Avenue
Philadelphia, PA 19111
Phone: (215) 697-1112
DSN: 442-1112
Email: help@salts.navy.mil

Detachment Offices

Norfolk
Phone: (757) 836-3091
DSN: 836-3091
Email: norfolk@salts.navy.mil

San Diego
Phone: (619) 556-0633
DSN: 526-0633
Email: sandiego@salts.navy.mil

Pearl Harbor
Phone: (808) 473-7526
DSN: 473-7526
Email: pearl@salts.navy.mil

NOVEMBER 2000

What is INMARSAT?

INMARSAT, or the International Maritime Satellite Organization, is a private, limited company that provides mobile satellite communications worldwide. Established in 1979 to serve the maritime community, INMARSAT has since evolved to become the only provider of global mobile satellite communications for commercial, distress and safety applications at sea, in the air, and on land. On April 15, 1999, INMARSAT became the first inter-governmental organization to transition to a private company. Made up of more than 1,200 companies worldwide, INMARSAT has its headquarters in London, England.

The U.S. government, to transmit unclassified, non-tactical voice and data from ships and other mobile units, heavily uses the INMARSAT system. Almost every U.S. military ship has an INMARSAT system onboard. The system hardware consists of an antenna, mounted somewhere on the ship s superstructure, and an INMARSAT terminal. The INMARSAT terminal is typically located in the Communication (COMMS) spaces, and is usually interfaced with the ship s internal phone system. There are approximately forty different brands of INMARSAT equipment, such as Magnavox and Sperry.

How is the INMARSAT System Accessed?

The INMARSAT world is divided into four overlapping ocean regions, covering every corner of the world, apart from the extreme North and South poles. An INMARSAT satellite and its operational spare cover each region. The satellites are in geo-stationary orbit 22,223 miles above the Earth s equator. Each satellite has its own access code. The access codes are as follows:

Satellite	Access Code
Atlantic East	871
Atlantic West	874
Pacific	872
Indian Ocean	873

Every time a call is made from an INMARSAT mobile satellite phone, it is beamed up to one of the satellites. On the ground, distributed all around the world, giant communications antennas, or Land Earth Stations (LES), are listening for the return signal. There are approximately 40 Land Earth Stations in 31 countries. The LESs then route the satellite signal into the ordinary telephone network. And when someone calls an INMARSAT customer, the call is completed in the same way — but in reverse.

COMSAT, the U.S. service provider for INMARSAT, operates four Land Earth Stations. They are located in Southbury, CT, Santa Paula, CA, Ankara, Turkey, and Kuantan, Malaysia. Other foreign LESs can be used, but U.S. government INMARSAT customers are encouraged to use the COMSAT stations in order to get cost efficient U.S. government usage rates.

How Much Does It Cost to Use INMARSAT?

Because it is a commercial satellite system, INMARSAT costs money to use. COMSAT, the U.S. access provider, has been awarded the Defense Information Technology Contracting Organization (DITCO) INMARSAT Digital Contract (DCA200-96-D-0048). This, couple with COMSAT s DITCO Contract, Volume Subscription Plan (DCA200-91-D-00200) provides U.S. government users services at a reduced rate. The rates to the U.S. government user for these services are as follows:

Service	Price p/min	Contract Number
INMARSAT A	$5.55	DCA200-91-D-0020
INMARSAT A w/High Speed Data	$11.25	DCA200-96-D-0048
INMARSAT B	$2.85	DCA200-96-D-0048
INMARSAT B w/High Speed Data	$9.00	DCA200-96-D-0048
INMARSAT M	$2.75	DCA200-96-D-0048

INMARSAT C service is priced by data size (DCA200-96-D-0048).

+ COMSAT Mobile Communication rates as of 04/23/99.
* For information on the type of INMARSAT services you have, contact COMSAT in Bethesda, MD at (301) 214-3000.

What Is Line Noise And What Causes It?

Line noise is static on the line. You have probably experienced static in regular long distance calls at some time or another. When using a satellite that is thousands of miles away, you are even more vulnerable to line noise. Since the satellites are orbiting above the equator, the further your ship/unit is from the equator, the lower the "sight line" of your antenna. This means, that, when you re at the Earth s equator, the "sight line" to the satellite is directly above you, because you are directly beneath the orbiting satellite. When you are closer to Australia, the "sight line" would be more at a forty-five degree angle. Because of the curvature of the Earth, as you move closer to the North or South Pole, the sight line becomes more horizontal to the Earth s surface.

Your COMMS operator may have the satellite "in the line of sight" (meaning the antenna is pointed in the right direction), however, there may be something between your INMARSAT antenna and the satellite that may be causing interference and/or blockage. In such cases, calls to the satellite will either be severely affected, or simply not go through at all. Examples of interference and/or blockage are radar antennas, the ship s superstructure, above-deck equipment, aircraft, another ship s superstructure (if alongside another ship), flight ops, and buildings (if inport).

The physical location of your INMARSAT antenna (usually a white or gray dome) is a very important factor. Blockage by the ship s superstructure or mast can impede getting a good, clear signal with the satellite. Of course, optimal real estate on the ship s mast or superstructure was not always available during many shipboard installations. Sudden, sharp turns, or other ship maneuverings, can cause your antenna to lose its satellite connection completely. Heavy, rolling seas can also disrupt satellite connection, especially for smaller ships.

What Does Line Noise Have to Do With Data Transmissions?

Voice calls over INMARSAT do not require a great deal of line integrity. Voice is a very easily transmitted medium. Even when a lot of line noise occurs, you can usually recognize the person's voice and figure out what the other party is saying. *This is not the case for data transmissions*! Data requires a much higher degree of line integrity. Line "hits" affect the transmitted data packets, which are then recognized by the far-end modem as garbage and must be retransmitted. ***This costs money*** since it takes longer for the data packets to get transmitted over the already-expensive satellite.

How Fast is Data Transmitted Over INMARSAT?

This is dependent upon a number of things, but know that INMARSAT is capable of High-Speed Data (HSD) transmissions of 64 kilobits (KB) internationally, and 56KB U.S. domestically. Generally, most ships or units utilize the low speed data transmission of 9600 BAUD.

BAUD basically means the number of bits transferred per second (BPS). Characters per second (CPS) is the measurement normally given on the WinSALTS transmission screen. This is also known as the Transfer Rate. Dividing the BAUD rate by 10 will give you your target CPS rate, since 8 data bits, plus a start and stop bit make up each transfer packet. 9600 BPS is the recommended setting for use with INMARSAT A and WinSALTS.

Ideally, if you re using a 9600-BAUD modem, you should see a CPS rate of 960. Of course, many of the things identified earlier in this document are factors that can have an affect on your CPS rate. Line noise, as mentioned earlier, corrupts data. When each packet arrives at the destination (i.e. SALTS CENTRAL), the receiving modem counts the number of bits. If the packet is corrupt, the receiving modem asks the sending modem to retransmit the packet. Numerous re-transmittals will seriously affect your CPS rate, since, not only does the packet have to be resent each time, the modems have to communicate that fact to each other, as well. When this happens, the CPS rate on the WinSALTS transmission screen may be significantly lower than 960.

If all attempts by your COMMS operator have been made to fine-tune the signal to the satellite, try lowering your BAUD rate in the WinSALTS program. This can be found by selecting System/Modem Settings/Baud Rate.

Why Will Lowering My BAUD Rate Help the CPS Rate?

Lowering the WinSALTS BAUD rate won't cause the CPS rate to be higher than it should be. However, if you are experiencing frequent line hits and low CPS rates, it will help the data to get there faster. For example, if the WinSALTS BAUD rate is set to 9600, and you are experiencing a lot of line noise, the data is being sent fast, but is needing to be resent over and over due to the error rate caused by the line noise. By lowering the BAUD rate, the data will actually travel faster at a slower speed because your error rate will be much lower. Thereby, reducing the number of times the modem has to retransmit the data packets to the far-end, receiving modem.

It is recommended that 9600 BAUD be selected as a starting point when transmitting over INMARSAT. Experience can dictate if this setting should be increased or decreased.

Can INMARSAT Be Accessed While Inport Overseas?

Yes, but there are a number of factors that might hinder your ability to access INMARSAT while inport overseas. Keep these in mind when trying to troubleshoot any INMARSAT problems:

1.) Commanding Officers frequently direct that shipboard transmitting systems are shutdown while inport.
2.) In many countries, use of satellite transmitters while inport is prohibited.
3.) The INMARSAT antenna s "line of sight" to the satellite may be obstructed or completely blocked by another ship, building or structure (i.e. a shipyard crane).

Remember that the distance you are from the Earth s equator can affect what blocks your antenna s line of sight!

What Other Alternatives are Available to Help Improve Transmission Speeds Over INMARSAT?

Upgrading the computer hardware is always an alternative, and definitely will help speed things up. There is something called a UART chip, which, if you have the latest version (16550) of the chip installed on your Input/Output board, will increase speeds immensely. Most new computer systems have this chip, but if your computer equipment has been around for a while, you may want to have this checked by your computer support personnel.

One important troubleshooting tip is to check that the all phone cables you are using are shielded. Unshielded cables will pickup electronic interference, causing signal degradation.

How Does WinSALTS Fit Into the Big Picture ?

Oftentimes, INMARSAT difficulties are discovered when trying to use WinSALTS. Therefore, many SALTS customers equate INMARSAT difficulties as being WinSALTS difficulties. This would be like complaining to your television manufacturer when your local cable company service fails. WinSALTS is **ONLY** the client-server application. It is **NOT** the communications pipe. WinSALTS is not a part of INMARSAT, the Internet, your command Local Area Network (LAN), or your computer hardware. The SALTS project does have an invested interest, however, in wanting to help you achieve the best possible INMARSAT service. By doing so, your use of WinSALTS will be more trouble-free and enjoyable.

The SALTS project has developed several other INMARSAT documents in addition to this one. The subject matter of the other documents is specific to the various types of INMARSAT service used in conjunction with WinSALTS. They can be downloaded through the WinSALTS program s Request Files from SALTS option, or from the SALTS Internet web page at www.salts.navy.mil.